

Title: Math Olympics

Brief Overview:

This learning unit integrates social studies and math concepts. The students will work in jigsaw cooperative learning groups to compete in four different math games. At the conclusion, the students will determine the winners, as well as the most appropriate data analysis displays.

Link to Standards:

- **Problem Solving** Students will demonstrate their ability to solve mathematical problems through collection and interpretation of data.
- **Communication** Students will demonstrate their ability to communicate mathematically by working in cooperative groups to collect, compile, display, and share data.
- **Connections** Students will demonstrate their ability to connect mathematics topics within the discipline and to other disciplines while compiling results of games, designing their country's flag, and presenting information about their country.
- **Number Relationships** Students will demonstrate their understanding of conceptual applications while compiling results to determine outcomes of games played.
- **Statistics** Students will demonstrate the ability to collect, organize, and display data that relates to the results of their games. Students will use appropriate graphs to display data.
- **Measurement** Students will demonstrate conceptual understanding of applying measurement to real-world problems while playing the games and recording the results.

Grade/Level:

Grades 3-4

Duration/Length:

This lesson will take 7 or 8 periods.

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

- Reading a map of the world
- Using direction terms to describe a location
- Adding decimals
- Constructing and labeling data displays

Objectives:

Students will:

- work cooperatively in groups.
- collect, organize and display data from resources.
- interpret and describe information from a data display.
- communicate data analysis through written response.

Materials/Resources/Printed Materials:

- Chart paper
- Ruler
- Calculators
- Student Worksheets
- Teacher Resources
- Spinners
- Number Cubes (dice)
- Crayons

Performance Assessment/Development/Procedures:

Teacher Note:

Times for all activities vary greatly depending on skill level of students and their experience with cooperative groups.

Day 1: Students will work in cooperative groups to name a country that they will represent in the Math Olympics.

- Divide class into groups of 4 (this is their: "team.")
The team can be created based on whatever topic you are studying:
 - If you are studying the world, each team can be a country.
 - If you are studying Indians each group can be a tribe.
 - If you are studying Maryland each team can be a county.
- Have each group create a unique team.
- Explain to groups that they are to make a flag that meets the specified guidelines determined by the teacher. The teacher can use some geometry criteria for team flags such as symmetry, right angles, congruency, etc.
- Have groups create a symbol to represent their team.
- Ask students to explain in writing why or how their symbol was chosen.
- Allow groups to share their projects.

Day 2: Students will represent their country in 2 of 4 Math Olympics games.

Teacher Note:

Just run a set of rules for each station, not each student. For spinner games, use a paperclip in the center of the spinner with a pencil.

- Group students with their teammates.
- Explain that today will be the Math Olympics and that each student will represent their team by playing two of the four games.
- Set up enough game stations to accommodate the size of your class.
- There are four games with four students playing at each location.
- Show students that each station has a set of rules and a data sheet to record the results of the game.
- Instruct students to be accurate and honest when recording their results.
- Use a jigsaw method to send students to game stations. Insure that there is only one member from a team at each station.
- Allow 15-20 minutes for students to play the first game.
- Send students back to their group.
- Tell students to exchange data sheets.
- Dismiss them to their second game.
- Allow 15-20 minutes to play the second game.
- Send students back to their original group.
- Tell students to make a second copy of their data sheet so others can see their data in tomorrow's lesson.
- Instruct students to be accurate and honest when copying their results.
- Collect both data sheets from each student and sort them by game to be distributed for tomorrow's lesson.

Day 3: Students will compile and display data from yesterday's competition.

Teacher Note:

Graphing techniques may need to be discussed with the class depending on their skill level. Teacher may need to do some directed teaching here.

- Group students with their teammates.
- Distribute a complete set of data sheets from one game to each team.
- Tell students to analyze the data and determine the best way to display the results of this game.
- Remind students that this display will be shared with the whole class and they will need to be able to explain how they made it or justify why they chose this method of display.
- Allow 45 minutes for students complete this activity.
- Allow students to present and show their data display in a location so all students can see the results of that game.
- Identify winners for each game and present medals if desired.

Day 4: Students will determine the overall winner and explain in writing how they arrived at their answer.

- Assign students the following question.

The class has presented different data displays. Evaluate each country's display. Tell which displays are the most useful. Which one gives information in a clear manner? Which one can you get information from the fastest? Select the best display and describe why you chose it in your math journal.

- Discuss with the students the following prompt:

Your class has just completed the Math Olympics. The medals have been awarded for each event. Tell how you would determine which team is the overall winner.

- Use the Teacher Resource Sheet to rank-order the teams so that you can determine the overall winner. Rank-ordering is when you assign a number value to each team for the place they achieved for each event. You add the numbers for each team and compare the final totals. The team with the lowest score is the overall winner.
- After the winning team is calculated, assign the following writing prompt.

Now that your class has completed the Math Olympics, the school newsletter would like to publish the results. Write an article for the school newsletter that announces the results of the Math Olympics. Be sure to include the following in your article:

- Which team was the overall winner.
- How your team compared with others.
- How math helped you determine the winner.
- A data display that summarizes the team standings.

Day 5: Students will discuss the probability involved in the events.

- Discuss the results from each event.
- Look at the spinners used for swimming and relay activities and the results.
- Discuss why the scores would be so different for each event if spinners were used for both.
- Do the same with basketball and volleyball.
- Discuss why the results for each of those events were so different if rolling dice were used for both.
- Use the score sheets and results to assist in the discussion.
- Be sure the students end up realizing that the spaces on the spinners and the way the dice were being recorded involve probability.
- Do more examples if needed.

Performance Assessment:

Students will be assessed on the following:

- **Group Work**

Students may be assessed by on-task behaviors and contribution to the group.

- **Written Response**

Students responses should be clear and use language and vocabulary related to the topic.

Extension/Follow Up:

- Compare student data with the data from the real Olympics.
- Create your own game to include in the Math Olympics and write the directions.
- Create games that deal with probability and have students calculate outcomes and theoretical and experimental probability.
- Show students other appropriate methods to display the Olympic data such as stacked bar graph, double bar graph, and line plots.

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800 Yard Relay Race

You will represent your team in 400 yards of an 800 Yard Relay Race. You will take four turns with each turn representing 100 yards of your team's race.

Rules of the Game

1. Each player will complete four rounds. One round consists of two complete spins.
2. Each player spins once on each spinner for each round.
 - Spinner 1 represents seconds (ex. 8.0)
 - Spinner 2 represents tenths of seconds (ex. 0.5)
 - Your run = 8.5 seconds
3. Record your times on the data sheet.
4. Total your score.

400 Meter Freestyle Swimming Race

You will represent your team in 200 meters of the 100 meter relay race. You will take four laps of your team's race.

Rules of the Game

1. Each player will complete 4 rounds. One round consists of two complete spins.
2. Each player spins once on each spinner for each round.
 - Spinner 1 represents seconds (ex. 8.0)
 - Spinner 2 represents tenths of seconds (ex. 0.5)
 - Your round = 8.5 seconds
3. Record your times on the data sheet.
4. Total your score.

Remember the object of the race is to complete the 200 meters in the least amount of time.

Volleyball

You are representing your team in volleyball. You score points in the tournament by rolling the number cubes. After the ten rolls calculate the total number of points earned for your team. Be sure to calculate your score based on the **point value**, not the number rolled. Your score will represent the first half of the game. Another member of your team will represent the second half of the game and these scores will be added together.

You will play against another team.
Take turns rolling and recording for each other.

Rules of the Game

- 1. Each player will roll ten times.**
- 2. Record the results on the scoring sheet using tally marks.**
- 3. Calculate the total points for each number rolled by multiplying the point value by the number of tallies.**
- 4. Calculate your total points. Your total points will be added to the points scored by your teammate.**

Basketball

In this event, each team will roll two number cubes to earn points for a basketball game. Points are determined by the sum of the digits on the number cubes.

Rules of the Game

1. Two teams will play against each other in a game of basketball.
2. Each team will have 10 turns rolling two number cubes.
(Take turns so one team rolls while the other team records the results and counts the rolls.)
3. At the end of 10 rolls, calculate your total number of points for the basketball game.

Team Name

800 Yard Relay Race

1st Runner	Seconds
100 yds.	
100 yds.	
100 yds.	
100 yds.	
TOTAL	

2nd Runner	Seconds
100 yds.	
100 yds.	
100 yds.	
100 yds.	
TOTAL	

Team Name

400 Meters Swimming Freestyle Race

50 Meters

TEAM	Seconds
length	
length	
length	
length	
TOTAL for 200 meters	

50 Meters

TEAM	Seconds
length	
length	
length	
length	
TOTAL for 200 meters	

1st 200 meters

2nd 200 meters

+

=

Total for
400 meters

Volleyball Results for _____ team.

Volleyball Results - 1st Half of the Game

Number Rolled	Point Value	Tallies	Total
7	1		
5, 6, 8, 9	2		
3, 4, 10, 11	3		
2, 12	4		

TOTAL

Volleyball Results - 2nd Half of the Game

Number Rolled	Point Value	Tallies	Total
7	1		
5, 6, 8, 9	2		
3, 4, 10, 11	3		
2, 12	4		

TOTAL

1st half score

2nd half score

+

=

**Final Volleyball
Score**

Basketball Team

Basketball Results
1st Half of the Game

Roll	Score
1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____
9	_____
10	_____
<hr/>	
Total Points	_____

Basketball Results
2nd Half of the Game

Roll	Score
1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____
9	_____
10	_____
<hr/>	
Total Points	_____

1st half score

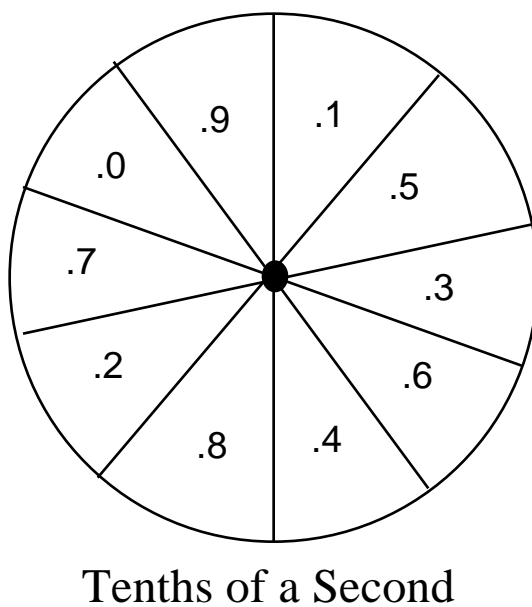
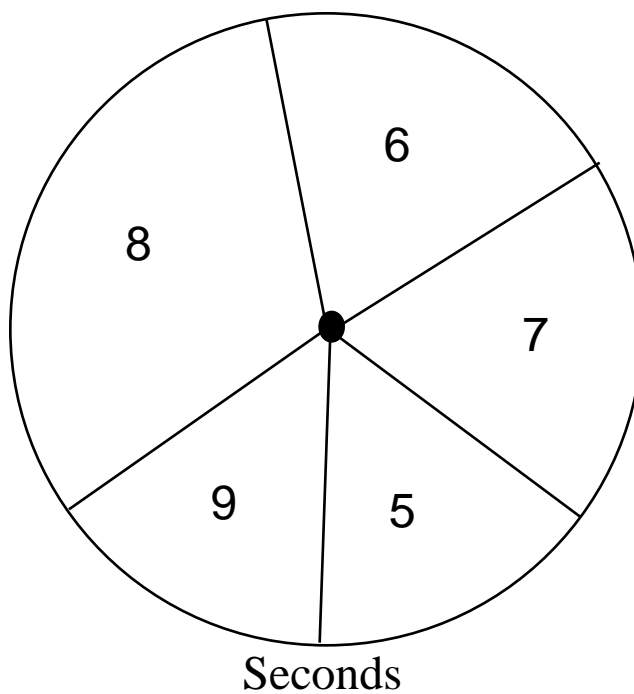
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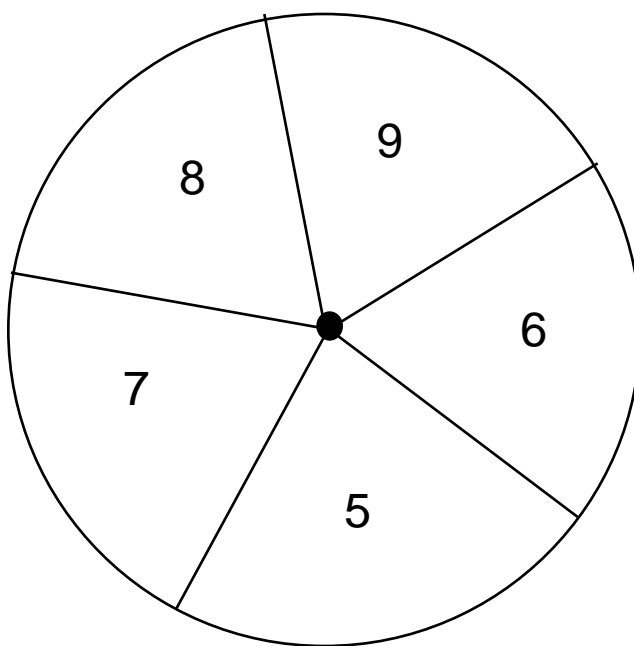
Final Basketball Score

2nd half score

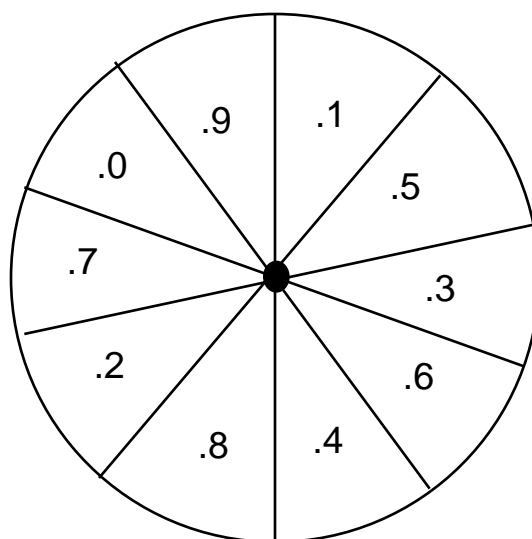
Relay Race Spinners



Swimming Spinners



Seconds



Tenths of a Second

Ranking Sheet for Math Olympics

1. List the name of each team on chart.
2. Give each team a number score for each event based on Olympic results.
Basketball winner gets 1, second place 2, third 3, and so on.
3. Repeat procedure for each event.
4. Total each team's points.
5. Team with the **lowest score** is the overall winner.

[illegible]